

Chapter 4

Pipeline Route Selection and Surveys

CHAPTER 4 PIPELINE ROUTE SELECTION AND SURVEYS

TABLE OF CONTENTS

PART 4.1	ROUTE CONSIDERATIONS	4-1
PART 4.2	ROUTE SURVEYS--GENERAL	4-1
PART 4.3	ENGINEERING INSTRUMENT SURVEY	4-2
PART 4.4	USE OF USGS QUAD MAPS	4-2

CHAPTER 4

PIPELINE ROUTE SELECTION AND SURVEYS

4.1 ROUTE CONSIDERATIONS

There are many considerations which should be made in selecting the route for a stockwater pipeline. Some of the most important ones are:

- Stockwater tanks should be located at sites with good drainage, be on solid ground and be where it will be easy to provide a tank overflow.
- The pipeline route should be selected to minimize the number of high and low spots in the line. High spots may require air valves and low spots in shallow lines may require drains.
- Routing the pipeline over moderate slope terrain makes it easier to trench for the pipeline.
- There must be access to all portions of the route by trenching equipment.
- Soils should be deep enough for trenching to the design depth.
- Avoid landslide areas and avoid crossing watercourses that are eroding.
- Avoid areas classified as wetlands
- Avoid crossing property lines where possible. An easement should be obtained for right-of-way and maintenance of the pipeline if it crosses a property line. Obtaining an easement takes a considerable amount of time and effort to complete.
- Full consideration should be given to the possibility of future expansion to the system. If a pipeline extension is anticipated then pipe size and rating should be appropriate for the ultimate extension.
- If large stock tanks or storage tanks are to be installed, locate them where access to heavy equipment is possible.
- Identify buried utilities and contact the utility company for technical guidance if the route must be located where it will intersect the utility route. Missouri One Call System, Inc. should aid in locating the buried utility (1-800-344-7484)

4.2 ROUTE SURVEYS--GENERAL

The type of survey information required for a pipeline depends on the characteristics of the pipeline. For example, consider a spring development with a 300-foot pipeline, with total fall between water surface in spring and a tank of only four feet. This system may require a very detailed survey to insure that the pipe grade and tank elevation will allow the system to operate properly.

On the other hand, a four mile long pipeline that has an elevation gain of 400 feet may only need a careful study of contours on a U.S. Geological Survey (USGS) quadrangle map to get enough information for an adequate design.

And in a third example, a four mile pipeline traveling over gently undulating topography and with total elevation differences not exceeding 25 feet may need a detailed profile run with an engineer's level.

The difference in these installations is that we must predict where air can collect in the pipe system and provide means for releasing it. Defining where these problem locations are will usually dictate the type of survey that should be completed.

4.3 ENGINEERING INSTRUMENT SURVEY

An engineering instrument survey should be used when available pressure head is small and where many small undulations in the terrain make it difficult to determine where all the high and low spots are located.

If a survey is needed, a good set of survey notes could become a valuable reference for you, for someone who may need to finish the job, for the landowner or for the contractor at a later date. Make sure the notes are complete and the circuit is closed to ensure accuracy.

4.4 USE OF U.S. GEOLOGICAL SURVEY QUAD MAPS

For long pipelines with major elevation changes, it is usually adequate to use contour elevation data from 7-1/2 minute series USGS quadrangle maps. Contour interval on most quad sheets of interest in Missouri is either 10 or 20 feet. Fairly accurate interpolations can be made to an elevation of 5 or 10 feet, which is usually adequate for high pressure pipelines. One caution is that it is extremely important to accurately locate ground locations on the map. If there is any question as to location, other methods of determining elevations should be used.

Horizontal distances can be estimated from the maps to the nearest 100 feet. Corrections must be made for additional distance caused by elevation changes. Remember, the actual pipeline length will be longer than horizontal distances measured from the map.

Pipeline length guesswork can be reduced by physically measuring the route distance. Depending on the accuracy needed, pipeline length can be measured by pacing, using a tape, string measurer or measuring wheel.